Amendments to the Claims:

1. (currently amended) Detector for detecting a high-intensity and high-energy particle beam (2), which comprises a crystalline semi-conductor plate (3) having a metal coating (4) and which is arranged on a substrate (5),

~~characterized in that~~ **wherein**

the semi-conductor plate (3) is a diamond plate (6), which is coated on both faces with metal structures (7, 8), the metal structures (7, 8) comprising aluminium and/or an aluminium alloy and the metal structures (7, 8) comprising electrodes (9), which are arranged to be connected to various electrical potentials by way of conductor tracks (10) on the substrate (5), and the substrate (5) comprising a ceramic plate (11) having a central orifice (24), which is covered by the diamond plate (6).

2. (currently amended) Detector according to claim 1,

~~characterised in that~~ **wherein**

the metal structures on the upper face (7) and lower face (8) of the diamond plate (6) form two unstructured continuous metal layers (12, 13), the metal layer (13) of the lower face (33) having a ground potential and the metal layer (12) of the upper face (32) being provided with a potential at which the diamond plate (6) has a field strength in the range from 0.5 to 5 Volts per micrometre.

3. (currently amended) Detector according to claim 2,

~~characterised in that~~ **wherein**

the metal structures (7, 8) on the upper face (32) and on the lower face (33) of the diamond plate (6) have a non-metallised peripheral region (53).

4. (currently amended) Detector according to claim 1~~ or claim 2~~,

~~characterized in that~~ <u>wherein</u>

the diamond plate (6) has, on its upper face (32) and its reverse face (33), non-metallised peripheral regions having a width that corresponds to at least the thickness of the diamond plate (6).

5. (currently amended) Detector according to ~~one of the preceding claims~~ <u>claim 1</u>,

~~characterized in that~~ <u>wherein</u>

the metal structure (8) on the lower face (33) of the diamond plate (6) has a continuous metal layer (13) and the metal structure (7) on the upper face (32) of the diamond plate (6) has a multiplicity of microscopically small contact surfaces (14) or metal strips (20), which are connected by way of bonding wires (15) and/or conductor tracks (16) on the ceramic plate (11) to external connections of the detector (100, 200, 300).

6. (currently amended) Detector according to ~~one of the preceding claims~~ <u>claim 1</u>,

~~characterized in that~~ <u>wherein</u>

the metal structures (7, 8) comprise a grid network (19) of metal strips (20, 21), the metal strips (21) of the lower face (33) of the diamond plate (6) being arranged at a right angle to the metal strips (20) of the upper face (32) of the diamond plate (6).

7. (currently amended) Detector according to ~~one of the preceding claims~~ claim 1,

~~**characterized in that**~~ **wherein**

the ceramic plate (11) has contact connection surfaces (22), which are connected to external connections of the detector (100, 200, 300) by way of a coaxial cable (41).

8. (currently amended) Detector according to ~~one of the preceding claims~~ claim 1,

~~**characterized in that**~~ **wherein**

the detector (100) has a carrier frame (23), on which its detector components are fixed.

9. (currently amended) Detector according to ~~one of the preceding claims~~ claim 1,

~~**characterized in that**~~ **wherein**

the detector (100, 200, 300) is arranged in a detector housing (43), which is provided with ground potential, and a metallised reverse face of the ceramic plate (11) being electrically connected, by way of an elastomeric electrically conductive buffer (48) of conductive rubber, to the detector housing (43).

10. (currently amended) Detector according to ~~one of the preceding claims~~ claim 1,

~~**characterized in that**~~ **wherein**

the orifice (24) in the ceramic plate (11) is circular or virtually tetragonal.

11. (currently amended) Detector according to ~~one of the preceding claims~~ claim 1,

~~**characterized in that**~~ **wherein**

the diamond plate (6) is a self-supporting polycrystalline diamond plate (6) formed by chemical gas phase deposition and having a thickness (d) in the range from 10 μm to 1000 μm, preferably from 100 μm to 200 μm.

12. (currently amended) Detector according to ~~one of claims 1 to 10~~ claim 1,

~~**characterized in that**~~ **wherein**

the diamond plate (6) is a self-supporting monocrystalline diamond plate (6) having a thickness (d) in the range from 10 μm to 1000 μm, preferably from 100 μm to 200 μm.

13. (currently amended) Detector according to ~~one of the preceding claims~~ claim 1,

~~**characterized in that**~~ **wherein**

the ceramic plate (11) has printed thin-film or thick-film conductors as interwiring lines or conductor tracks (10) and passive components in thin-film or thick-film technology.

14. (currently amended) Beam apparatus for high-intensity particle beams having 10^5 to 10^{13} particles per pulse packet, preferably having 10^7 to 10^{13} particles per pulse packet, the beam apparatus having a detector (100, 200, 300) according to ~~one of claims 1 to 13~~ claim 1.

15. (original) Method for the production of a detector (1) for detecting high-intensity and high-energy particle beams, which detector comprises a crystalline semi-conductor plate (3) having a

metal coating (4) and which detector is arranged on a substrate (5), the method comprising the following method steps:

- provision of a substrate plate (27),
- chemical gas phase deposition, on the substrate plate (27), of a diamond layer (28) of carbon,
- removal of the substrate plate (27) from the diamond layer (28) to form a self-supporting diamond plate (6),
- coating of the upper face and reverse face of the diamond plate (6) with metal structures (7, 8),
- production of a ceramic plate (11) having a central orifice (24) and interwiring lines or conductor tracks having contact connection surfaces (22) and/or passive components,
- mounting of the diamond plate (6), metallised on both sides, on the ceramic plate (11), the central orifice (24) being covered,
- connection of the metal structures (7, 8) of the diamond plate (6) to the conductor tracks (10) or metal layers (17) on the ceramic plate (11),
- fixing the detector components on a carrier frame (23).

16. (currently amended) Method according to claim 15,

~~characterized in that~~ wherein

for the chemical gas phase deposition of a diamond layer (28) of carbon on the substrate plate (27) a gaseous organocarbon substance is used.

17. (currently amended) Method according to claim 15~~ or claim 16~~,

~~characterized in that~~ wherein

the gaseous substance comprises hydrogen together with 0.2 to 2 % by vol. methane.

18. (currently amended) Method according to ~~one of claims 15 to 17~~ claim 15,

~~**characterized in that**~~ **wherein**

for removal of the substrate plate (27) from the self-supporting diamond layer (28) a plasma etching method is used.

19. (currently amended) Method according to ~~one of claims 15 to 18~~ claim 15,

~~**characterized in that**~~ **wherein**

for removal of the substrate plate (27) from the self-supporting diamond layer (28) a chemical wet etching method is used.

20. (currently amended) Method according to ~~one of claims 15 to 19~~ claim 15,

~~**characterized in that**~~ **wherein**

for coating of the upper face (32) and reverse face (33) of the diamond plate (6) with a metal layer (12, 13) a sputtering, vapour-deposition or sintering method is used.

21. (currently amended) Method according to ~~one of claims 15 to 20~~ claim 15,

~~**characterized in that**~~ **wherein**

for coating of the upper face (32) and/or reverse face (33) of the diamond plate (6) with a metal structure (7, 8) a sputtering or vapour-deposition method employing a mask is used.

22. (currently amended) Method according to ~~one of claims 15 to 21~~ claim 15,

~~**characterized in that**~~ **wherein**

for coating of the upper face (32) and reverse face (33) of the diamond plate (6) with a metal structure (7, 8) a metal layer (12, 13) is first applied, which is subsequently structured by means of photolithography.

23. (currently amended) Method according to ~~one of claims 15 to 22~~ claim 15,

~~**characterized in that**~~ **wherein**

for coating of the upper face (32) and reverse face (33) of the diamond plate (6) with a metallic strip pattern (20, 21) a metal layer (12, 13) is first applied and subsequently insulation channels or longitudinal grooves are introduced into the metal layer (12, 13) by photolithographic means.

24. (currently amended) Method according to ~~one of claims 15 to 23~~ claim 15,

~~**characterized in that**~~ **wherein**

for provision of interwiring lines or conductor tracks (10), contact connection surfaces (22) and/or passive components on the ceramic plate (11) there are used thin-film or thick-film methods.

25. (currently amended) Method according to ~~one of claims 15 to 24~~ claim 15,

~~**characterized in that**~~ **wherein**

for connection of the metal structures (7, 8) of the diamond plate (6) to interwiring lines or conductor tracks (10) on the ceramic plate (11) there is used a bonding method.

26. (currently amended) Method according to ~~one of claims 15 to 25~~ claim 15,

~~**characterized in that**~~ **wherein**

for fixing of the detector components on a carrier frame (23) a metallic holding frame (34) is provided, which holding frame at the same time establishes a ground potential connection by way of a conductor track on the ceramic plate (11).

27. (currently amended) Use of the detector according to ~~one of claims 1 to 14~~ claim 1 in the detection of high-intensity particle beams of a beam apparatus having beam intensities of 10^5 to 10^{13} particles per pulse packet, preferably having beam intensities of 10^7 to 10^{13} particles per pulse packet.